

A NOVEL ON LINE METHOD TO DETECT AND QUANTIFY A SET OF ANHYDROSUGARS EMITTED IN THE ATMOSPHERE.

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In the frame of the Bio Chemical Collectors (BCC) research project funded by the French Atomic Energy Commission department of Military Application (CEA-DAM) we have developed a novel method to detect atmospheric targets at very low levels. Our concept is to mix a high flow of atmospheric air in a supersaturated water growth chamber to condense the gas phase on grown particles. The jet which contains the analytes is formed by micrometric droplets. These droplets are immediately impacted and collected by a microfluidic system. The liquid sample obtained can be injected on any analytical system for the on line analysis of dissolved gases and particles. This system is also efficient to collect insoluble material like dust or carbonaceous material. To test our concept of this new atmospheric collector/concentrator we choose to detect major's anions and biomass burning tracers at low concentration. The levoglucosan has been shown to be a good tracer for biomass burning emissions in fine atmospheric particulate matter and exhibit a nice variability and seasonality ranging from ng to µg per cubic meter. Generally this tracer is detected and quantified on 24 hours filters by High-Performance Anion-Exchange Chromatography with Pulsed Amperometric Detection (HPAEC-PAD) or a Mass Spectrometers (MS). Recently on line methods have been developed to do on line analysis of one or two targets using systems like Particle Into Liquid Sample coupled to Mass spectrometers (PILS-MS). This type of instrumentation is cost effective and requires complex maintenance; furthermore it cannot be easily deployed on the field. Here we present our results to detect and quantify a set of anhydrosugars like Levoglucosan, manosan and galactosan at low levels in near real-time. The collection/concentration of liquid samples has been tested on a modified PILS. The small volume of sample collected has been simultaneously injected on Ion Chromatography Systems: ICS 2000 for anions and ICS 5000+, for ions and sugars. In our configuration the LOD and the LOQ were respectively in the range of few ng /m³ for Levoglucosan.

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